EU Regulatory Requirements for Short Range Devices

Claus Rømer Andersen

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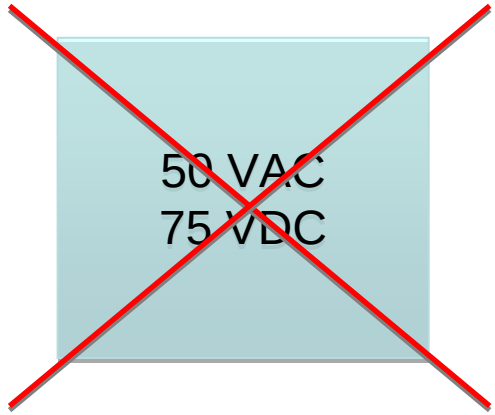
Agenda

- General overview
- Case: Garage door opener (433 MHz)
  - Radioparameter test requirements
- Administrative requirements
  - Conformity assessment procedure
  - Label
  - TCF

General overview

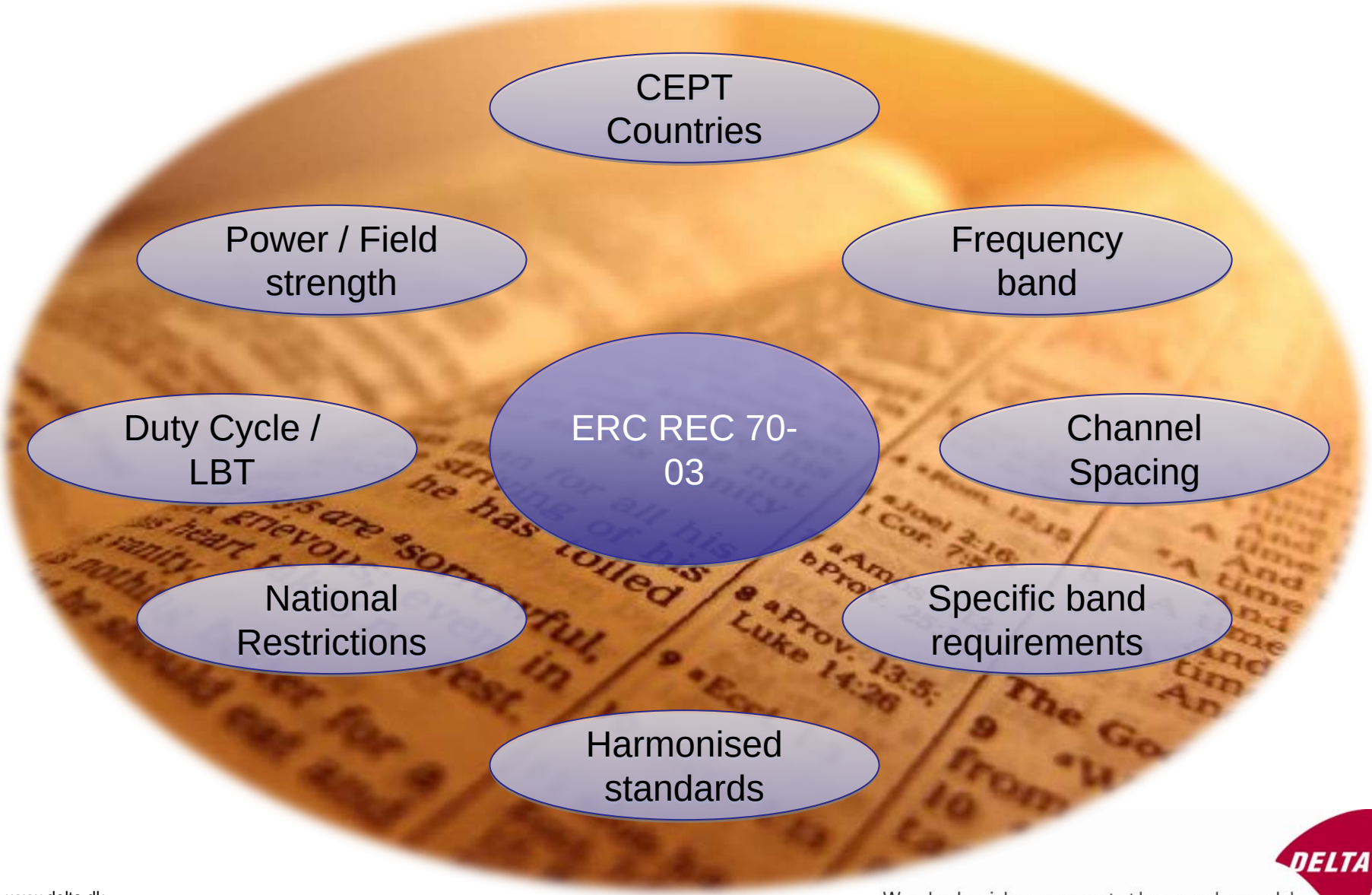
General overview

Some devices are safer than others ...



Yet the requirements of the LVD apply from 0 V

Frequency bands for short range devices



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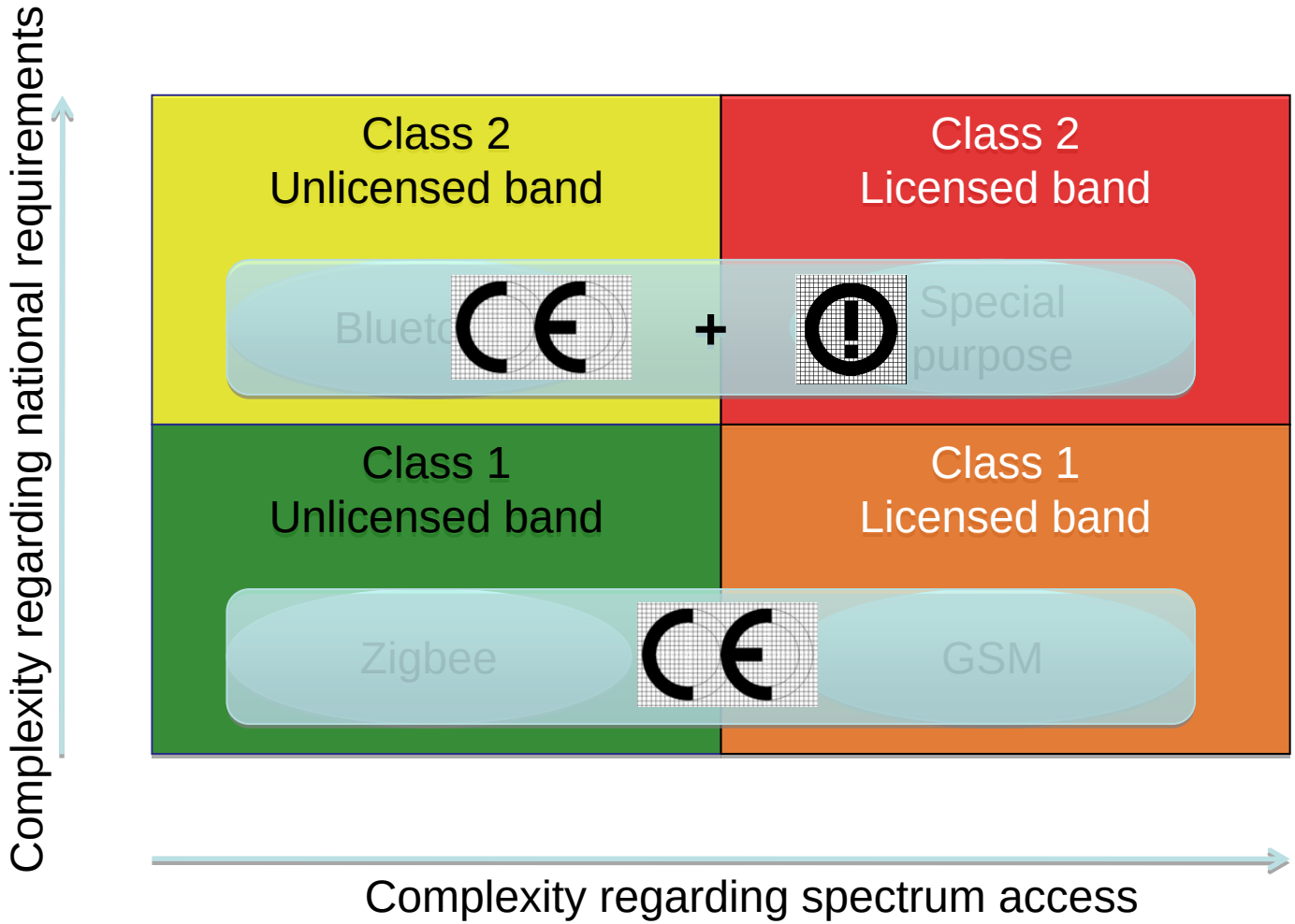
Licensed vs. Unlivensed & Class 1 vs. Class 2



The most common Harmonised Standards

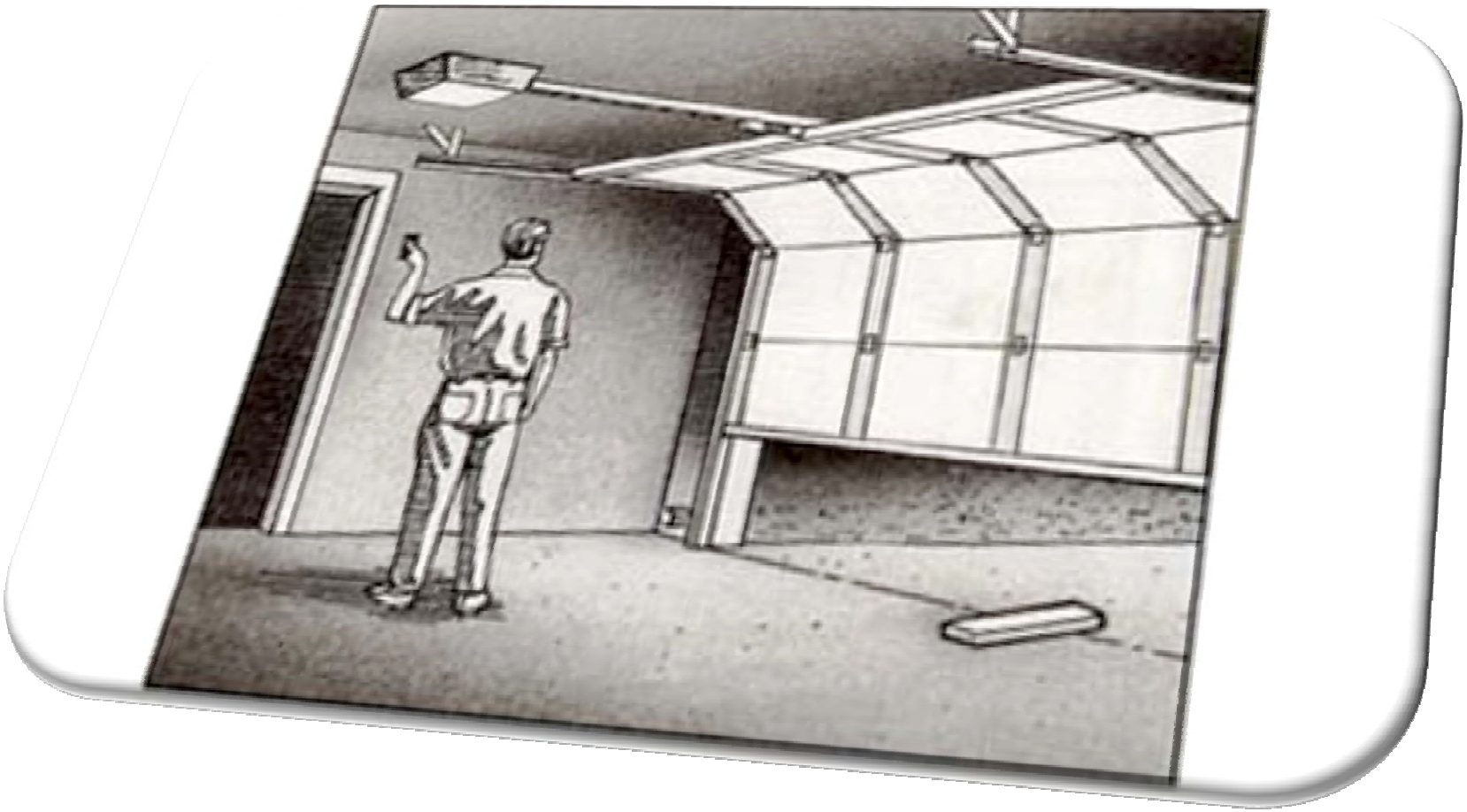
Radioparameters	• EN 300 330:	0.09-30 MHz
	• EN 300 220:	25-1000 MHz
	• EN 300 440:	1-40 GHz
	• EN 300 328:	2.4 GHz WB
EMC	• EN 301 489-01:	Common req.
	• EN 301 489-03:	SRD 9 kHz - 40 GHz
	• EN 301 489-17:	2.4 & 5 GHz WB
Safety	• EN 60950-1:	Safety, IT equipment
	• EN 50371:	EMF, 10 MHz - 300 GHz
	• EN 50392:	EMF, 0-300 GHz

Why do these requirements exist?

Because we do not want to meet this woman in our front door when we come home after she bought a new wireless device that does not work!

And because we do not want this facial expression on the faces of our clients!

Case: 433 MHz Garage Door Opener



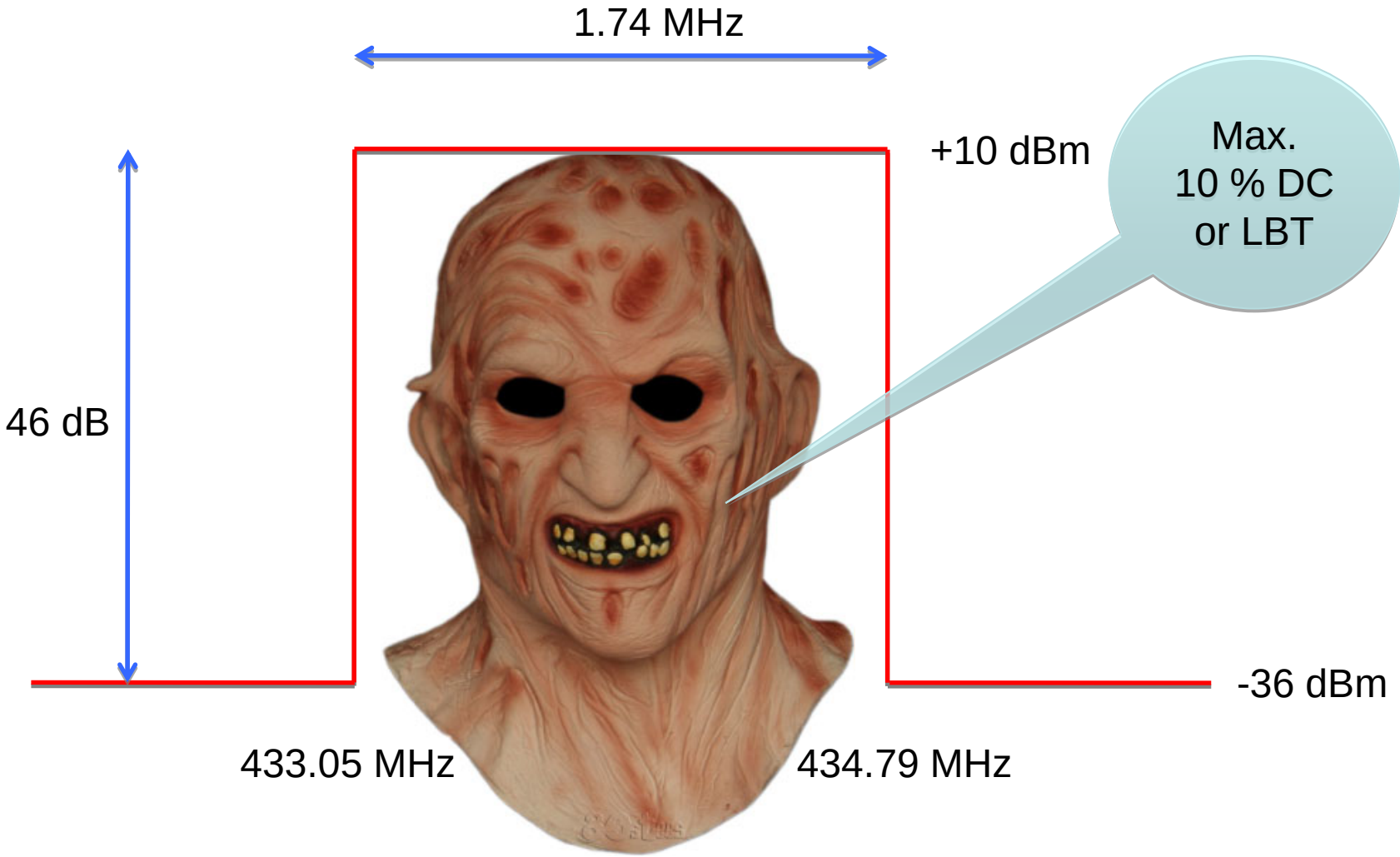
Frequency band requirements

Class 1 - Sub-class 20		
Parameter	**Description**	**Comments**
Frequency band	433.05 - 434.79 MHz	
Radio service according ITU Radio Regulation	Mobile Service	
Application	Non-Specific Short Range Device (Audio and voice signals, and video applications are excluded)	This category is available for any type of application which fulfils the technical conditions (typical uses are telemetry, telecommand, alarms, data in general and other similar applications).
Channel Spacing	not defined	
RF – Power	not defined	
RF – Radiated Power	10 mW e.r.p.	
Transmit / Receive spacing (Duplex direction)	not defined	
Type(s) of modulation	not defined	
Duty cycle	up to 10 %	
Harmonised Standard representing the state of art	EN 300 220 - 2	
Equipment class according to Commission Decision 2000/299/EC*	Class 1	

ERC REC 70-03, Annex 1, band f

- The duty cycle, LBT or equivalent technique shall not be user dependent and shall therefore be guaranteed by appropriate technical means.
- Listen before talk (LBT) with a preferred option of adaptive frequency agility (AFA) feature may be used instead of duty cycle. LBT is defined in EN 300 220.
- National restrictions disallowing audio and voice.

Spectrum Masc



Receiver classification

Receiver Class	Risk assessment or receiver performance
1	Safety critical SRD communication media; i.e. for devices serving systems where failure may result in a physical risk to a person
2	Function critical SRD communication media; i.e. when a failure to operate correctly causes loss of function but does not constitute a safety hazard.
3	Non-critical SRD communication media whose failure to operate correctly causes loss of function which can be overcome by parallel means.

Extreme temperatures of EN 300 220

Category	Temperature range
I: General	-20°C to + 55°C
II: Portable equipment	-10°C to + 55°C
III: Equipment for normal indoor use	+5°C to + 35°C

Extreme test power source of EN 300 220

Power source	Test voltage
AC mains	+/- 10 %
Regulated lead acid	-10 % to +30 %
Float charge gell-cell	+/- 15 %
Battery indicator	End point indicated voltage to nominal voltage
Leclanche or lithium	- 15 % to nominal voltage
Nickel-cadmium	-10 % to nominal voltage
Other battery types	Low: declared by equipment provider to nominal voltage
Other power sources	Agreement between laboratory and equipment provider

Definitions of EN 300 220

- **Integral antenna:** permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment
- **LBT:** Listen Before Talk
- **AFA:** Adaptive Frequency Agility
- **Narrowband**: non channelized band of less than 200 kHz or channelized band with less than 200 kHz channel spacing
- **Wideband:** > 200 kHz band or > 200 kHz channel spacing

Test requirements of EN 300 220-2 V2.1.2:2007

Requirement	Applies if
Frequency error or frequency drift	Always
Carrier power (conducted)	Not integral or dedicated antenna
Effective radiated power	Integral or dedicated antenna
Transient power	Always (… non channelized?) Req. removed in 2008 std.
Adjacent channel power	Narrowband
Modulation bandwidth	Wideband
Spurious emissions (Tx)	Always
Frequency stability under low-voltage conditions	Battery operated
Duty cycle	Not LBT with AFA
Receiver spurious radiation	Always

Test requirements of EN 300 220, continued

Requirement	Applies if
Minimum Tx off-time	LBT
Minimum listen time	LBT
Maximum Tx on-time	LBT
Maximum usable sensitivity	LBT
Rx LBT treshold & maximum Tx on-time	LBT

Test requirements of EN 300 220, continued

Requirement	Applies if
Adjacent channel selectivity	Class 1 receiver
Blocking or desensitization	Class 1 or 2 receiver or LBT
Inter-modulation response rejection	Class 1 receiver
Receiver spurious response rejection	Class 1 receiver
FHSS	FHSS
Spread spectrum other than FHSS	Spread spectrum other than FHSS

Administrative requirements

Conformity assessment procedure

Label

Technival construction file

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Conformity assessment – Annex II

- Technical documentation
- CE mark (on equipment and acompanying documentation)
- Declaration of conformity
- Manufacturing proces must ensure compliance

Conformity assessment – Annex III

- Annex II plus:
- Essential radio test suite identified by notified body
- Manufacturer must declare that the apparatus complies with this essential test suite
- Affix NB ID number on label

Conformity assessment – Annex IV

- Annex II + III plus:
- Technical documentation presented to NB for review

Administrative requirements - Label

Type number
Batch and/or Serial number
Name of manufacturer

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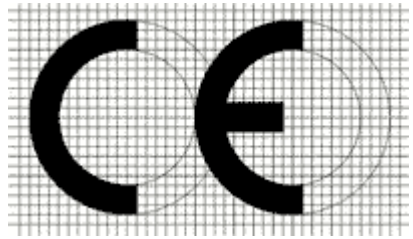

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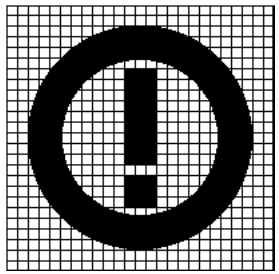

If not Class 1 frequency band

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Notified Body
Reference Number

If Notified Body has been isued

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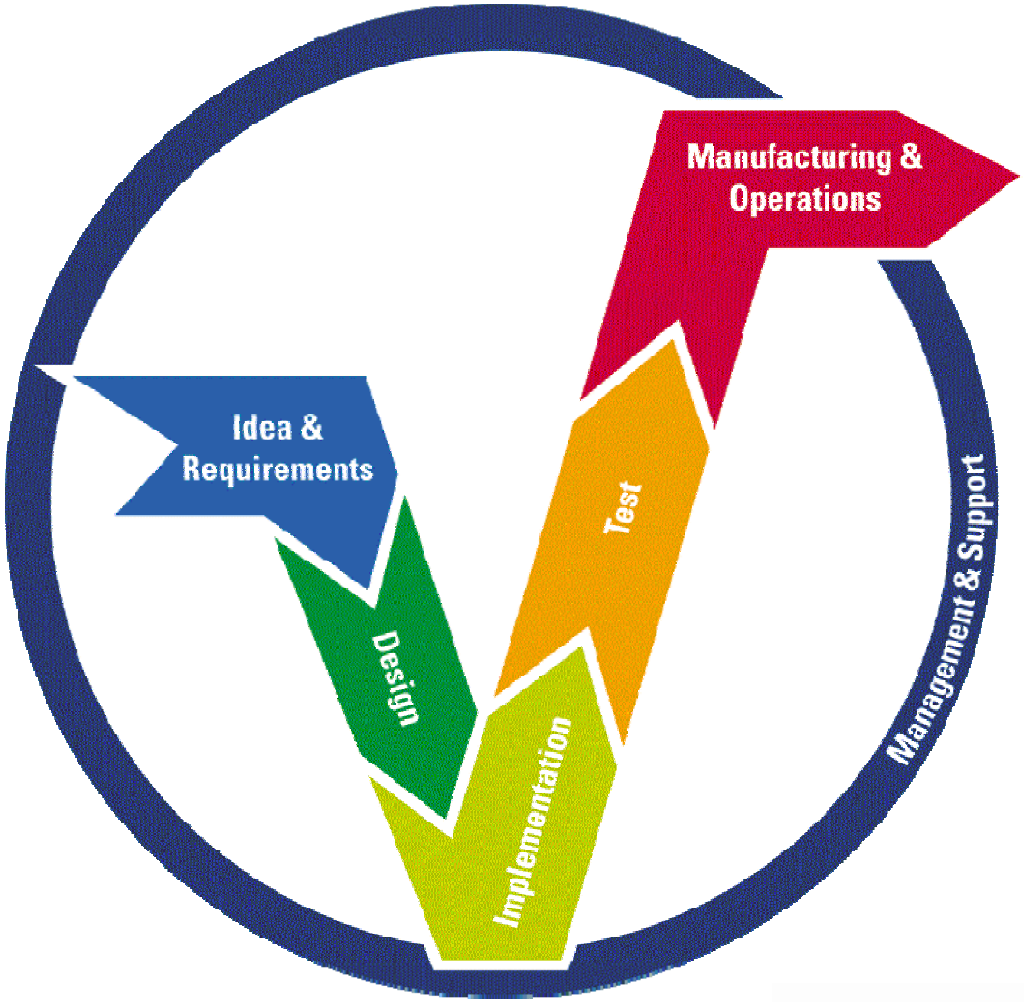
Technical construction file

- Kept for 10 years after last product has been manufactured
- Must enable conformity with essential requirements
- General product description
- Conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits, etc
- Descriptions and explanations
- List of applied harmonised standards
- Results of design calculations, examinations, etc.
- Test reports
- Declaration of conformity

When should identify your requirements?



Why are we doing this?

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